**Climate
of the Past
Discussions**

Interactive
Comment

Interactive comment on "Mismatch between the depth habitat of planktonic foraminifera and the calibration depth of SST transfer functions may bias reconstructions" *by* R. J. Telford et al.

Anonymous Referee #1

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Telford et al présents a re-analysis of core top planktic foraminifer fauna assemblage data from the North Atlantic, and apply it in SST and subsurface temperature estimations for the records since the last glacials. The estimated SST patterns were compared to the outputs from OA GCMs for the present and the LGM surface oceans, which is an excellent example that demonstrates the utility of paleo-data for calibrating modeling runs for predicting future climate. The overall objective of the manuscript is significant, and would be great contribution to paleo-cimate community. However, after I read this manuscript I found the following points that need the authors to make it clear: 1. The authors stated that many problems that previous transfer function methods may encountered, for example, the multiple environmental interferences or joint controls of

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more than one environmental variables that may caused the transfer function estimates invalid or in large errors. This is very true especially to the transfer function methods that adopt regression equations (such as Imbrie-Kipp Method) as the co-variance problem always occurs when it was regressed against one variable dependent on more than one parameters. However, in this paper the authors actually used MAT (Modern Analog Technique) that is a method based on dissimilarity coefficients between fauna assemblage data without any assumption of correlation or response function models. I am not clear that the "errors" generated by the MAT is that closely related to the co-variance or multiple environmental control problem inherent from our core top data base; 2. Therefore, I don't see any sign of "errors" on the downcore estimations is directly coming from the multiple controls. The subsurface warming, sometimes shown in the downcore records (for example, V22-222 in Fig. 4), may reflect true signals as the thermocline became thick during the glacial near the subtropical gyre in the north Atlantic. It's hard to say any error in the downcore estimates except that we have independent evidence (geochemical SSTs, etc.); 3. As the authors adopted MAT approach to estimate SSTs, I don't understand what are the "proportion of variance explained by —" (in Fig. 5). The proportion of variance is normally generated by using a fauna matrix decomposed from coretop data in interpreting downcores. Are these numbers on the Y-axis of Fig. 5 dissimilarity coefficient? 4. I can't read the "Euclidean distance" on Fig. 6; 5. The authors concluded that "the forward models" of planktic foraminifer assemblage may improve the results. To accomplish a complete article in the "Climate of the Past", I suggest that the authors should show some examples and why and where the forward models could improve the results. I hope the authors could address fully the problems I raised in above. Though the manuscript proposed several important questions in pale oceanography, the present version of the manuscript is not ready for publication.

Interactive comment on Clim. Past Discuss., 8, 4075, 2012.